

AN EVALUATION OF EARLY READING FIRST
ON EMERGENT LITERACY SKILLS:
PRESCHOOL THROUGH MIDDLE OF FIRST GRADE

A Dissertation

by

SOPHIA TANI-PRADO

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2010

Major Subject: School Psychology

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ABSTRACT

An Evaluation of Early Reading First on Emergent Literacy Skills: Preschool through Middle of First Grade. (August 2010)

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Chair of Advisory Committee: Dr. Jorge E. Gonzalez

Early Reading First is a federal initiative that seeks to buffer against the detrimental effects of poverty on children's academic outcomes by incorporating all of the elements supported by scientifically-based reading research to address the present and future reading gaps of high-risk preschool children. The tenets of ERF are teacher professional development, high quality language and print-rich environments, the teaching of emergent instruction of emergent literacy skills based on scientifically based reading research (SBRR) and the early identification of reading problems through the informed use of appropriate assessment measures. The present study was designed to assess the effectiveness of ERF enriched preschool classrooms located in a small city in a Southwestern state on both short- and mid-term early literacy outcomes of high risk preschoolers in a treatment condition and a comparison group.

A total of 239 children participated in the study; 110 children in the ERF treatment group and 129 children in the "practice as usual" contrast group. The longitudinal effect of the ERF intervention on participating students (from pre-kindergarten through the middle of first grade) was investigated via multilevel modeling. Four multilevel models were developed for two subtests of the Tejas Lee (Francis, Carlson, & Cardenas-Hagan, 2006): Spanish alphabet knowledge (i.e, identificación de las letras) and Spanish story comprehension (i.e., comprensión

auditiva); and two subtests of the Texas Primary Reading Inventory (TPRI; Center for Academic and Reading Skills, 2004): English Alphabet Knowledge and English Story Comprehension.

Results of the present study support the findings reported by similar prior studies, indicating that while ERF effectively increases students' alphabet knowledge, greater effort is necessary toward programming for increasing student outcomes on story comprehension.

DEDICATION

For Tomas

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TABLE OF CONTENTS

	Page
ABSTRACT	iii
DEDICATION.....	v
ACKNOWLEDGEMENTS.....	vi
TABLE OF CONTENTS	vii
LIST OF FIGURES	ix
LIST OF TABLES	x
CHAPTER	
I INTRODUCTION: BACKGROUND AND RATIONALIZATION ..	1
Overview of Early Reading First	3
Study Purpose	7
Hypotheses.....	9
II REVIEW OF THE LITERATURE	10
Hispanics: At Increased Risk.....	12
Preschool and Standards-based Reform.....	15
Early Reading First: Enriching Preschools.....	16
Summary and Purpose of Study.....	26
III METHOD.....	28
Participants	28
Teachers.....	29
Early Reading First Classrooms	29
Contrast Classrooms.....	35
Measures.....	36
Procedures.....	39
IV RESULTS.....	41
Results by Hypothesis	51

CHAPTER	Page
V DISCUSSION AND CONCLUSION.....	59
Summary.....	62
Tentative Implications.....	63
Limitations.....	67
Direction for Future Research.....	68
Conclusion.....	69
REFERENCES	71
APPENDIX A.....	81
VITA	82

LIST OF FIGURES

	Page
Figure 1 Spanish Alphabet Knowledge	49
Figure 2 English Alphabet Knowledge.....	49
Figure 3 Spanish Story Comprehension	50
Figure 4 English Story Comprehension.....	50

LIST OF TABLES

	Page
Table 1 Demographic Characteristics of ERF and Contrast Children	28
Table 2 Teacher Characteristics Year 2.....	29
Table 3 Baseline Group Comparison.....	42
Table 4 Measures Administered Across Time Points.....	44
Table 5 Descriptive Statistics for Spanish Group.....	45
Table 6 Descriptive Statistics for English Group.....	46
Table 7 Zero-Order Correlation Spanish Table.....	47
Table 8 Zero-Order Correlation English Table.....	48
Table 9 Estimates of Fixed Effects for Spanish Alphabet Knowledge.....	52
Table 10 Estimates of Fixed Effects for English Alphabet Knowledge.....	53
Table 11 Estimates of Fixed Effects for Spanish Story Comprehension.....	54
Table 12 Estimates of Fixed Effects for English Story Comprehension.....	55

CHAPTER I

INTRODUCTION: BACKGROUND AND RATIONALIZATION

The face of education is changing. Despite the new face, gaps in school achievement continue to disproportionately plague large numbers of academically at-risk children and youth, especially Hispanics and the poor. Currently, the Hispanic school-age population, (i.e. individuals with origins in the Spanish-speaking countries of Latin America), is the fastest growing group in American schools, increasing at a faster rate than any other ethnic group (NCES, 2003). At the same time, faced with a chronically disparate reading performance gaps, Hispanics are among the most educationally vulnerable groups of students in schools (NAEP, 2007; NCES, 2003). Their academic shortcomings are evident in the most recent National Assessment of Educational Progress (NAEP, 2007) report, where barely half (49.55%) of Hispanic children in fourth grade could read beyond the basic level, compared with 78% of non-Hispanic Whites.

Many Hispanic children living in the United States start out at a disadvantage. Even before formal schooling begins, they face numerous and cumulative risks that ultimately take their toll via unrealized academic potential. These challenges include low English proficiency, impoverished home literacy environments, low parental education, poor parental responsiveness, and poverty. Early childhood school programs in general have not been capable of diminishing the unfavorable aspects of young Hispanic children's early life experiences (NICHD, 1998). For children of low socio-economic means or who are minority, one year of low-quality preschool

This dissertation follows the style of *Journal of Educational Psychology*.

education appears to have no positive effect (Biemiller, 2003). Policymakers, educators, and researchers have taken note. Determined to protect against the myriad of risks faced by Hispanic and poor students, advocates of early childhood education have promoted initiatives to provide early, sustained, and intensive interventions to maximize high-risk students' learning during critical windows of optimal sensitivity to cognitive development.

Recognizing the empirical evidence documenting that high-quality preschool programming has the potential to mitigate against many of the difficulties Hispanic or poor children face (Snow et al., 1998), the “time was ripe for significant action in the early childhood arena” (Roskos, 2007, p. 21). Supported by accumulating evidence for quality early literacy instruction, policymakers developed and introduced initiatives such as *Good Start, Grow Smart* (2002) and *Early Reading First* (2005) (ERF) programs.

The *No Child Left Behind* (NCLB) Act of 2001 was introduced to “close the achievement gap with accountability, flexibility, and choice” (NCLB, 2001, §1425). From NCLB, emerged the *Good Start, Grow Smart* (GSGS) initiative with the goal of preparing young children to begin school ready to learn (Christie et al., 2002). *Early Reading First* (ERF), the flagship GSGS program, was created to promote in young children the skills they need to acquire before entering kindergarten. Each of the programs followed scientifically-based reading research (SBRR) principles and practices known to alleviate experiential deficits that come with being poor and/or Hispanic. The programs set clear guidelines for what children must learn while stipulating high quality professional development and use of curricula aligned to standards and expectations. In addition, accountability is incorporated into each of these initiatives through basic skills assessment (Roskos, 2007). GSGS programs emphasized that to promote the development of early literacy skills, what is most important is the quality of the instruction

provided (US Department of Education, 2008). Quality is most essential when targeting those children most at risk (Barnett, 2004).

Overview of Early Reading First

The ERF program was designed to support the enhancement of existing preschool programs to transform them into classrooms of excellence that adopt scientifically-based reading research (SBRR) principles and practices. More than any prior program, ERF delineated the kind of early literacy instruction that should be provided in preschool classrooms, and specified how this instruction should be delivered (Roskos, 2007). ERF-enriched programs were to be designed to equip young children with necessary language, cognitive and early reading skills that help prevent the development of downstream reading difficulties (Christie et al., 2002), getting them ready to begin school with the preparation needed to benefit from formal academic instruction.

While evidence clearly showed that high quality instruction could compensate for early disadvantage, those most likely to benefit were paradoxically the least likely to receive this instruction (Barnett, 2004). Low-income or minority families often did not have access to preschool programs, and the programs that were available were often of poor quality with inexperienced teachers, limited resources, and locations in impoverished neighborhoods (Snow et al., 1998). ERF was driven by priorities that addressed the needs of the most educationally vulnerable groups of children, those whose language was something other than English, or those growing up in poverty. Driven by evidence-based seminal works (e.g. Snow et al., 1998; Shonkoff & Phillips, 2000), ERF sought to converge children's knowledge targeted around a few key set of assumptions, namely: (a) professional development for teachers, (b) high quality

language and print-rich environments (c) interventions developed using scientifically-based reading research principles and (d) universal and progress monitoring assessments.

Professional Development

With the intention to build capacity, *ERF* recognized that at the classroom level, high quality staff and professional development is essential (Roskos, 2007). Research shows that to be effective, teachers must have ample knowledge of child development, as well as about how children learn, what they know and what they can accomplish (Snow et al., 1998). They must be able to identify students' strengths and weaknesses in order to plan instruction that meets individual child needs (Strickland & Riley-Ayers, 2006). Furthermore, teachers must be knowledgeable about scientifically-based language and early reading research, and they must know how to implement SBRR-grounded instructional strategies (Christie et al., 2002). Professional development in early childhood is essential in helping teachers not only gain the evidence-based knowledge, but also to help them integrate and apply this information in their classrooms (Strickland & Riley-Ayers, 2006).

High-Quality of Print-rich Environment

Research shows that the quality of a preschool program attended is associated with positive effects on language and preliteracy skills (Snow et al., 1998). Environments that are rich in print and in high-quality language promote children's talking, listening, reading, and writing. Engaging in abundant language-and print-related activities is necessary for helping children learn about language and literacy (Christie et al., 2002). Meaningful language and literacy experiences provide a foundation for later reading.

Scientifically-based Reading Research (SBRR)

NCLB (2001) requires that all instructional materials employed in ERF be premised on scientific reading research. To meet the NCLB definition of “scientifically based,” preschool programs drawing on SBRR “must employ systematic, empirical methods that draw on observation or experiment, involve rigorous data analyses that are adequate to test the stated hypotheses and justify the general conclusions, and rely on measurements or observational methods that provide valid data” (NCLB, 2001, §1550). The exclusive use of SBRR-based instructional materials and methods helps ensure the validity and relevance to reading development, reading instruction, and prevention of reading difficulties.

In addition to using SBRR-based instructional materials, ERF integrates literacy activities that support the development SBRR-identified skills. Research has found that children begin accruing important experiences related to reading from very early in life, and that children who have difficulty learning to read tend to be those who begin school with less prior knowledge and skill in certain domains (Snow et al., 1998). Research has also consistently found that children can be prevented from starting school with inadequate literacy-related knowledge through direct, systematic instruction of these basic early literacy skills (Snow et al., 1998; Christie et al., 2002).

Among the skills supported by SBRR, ERF directly targets instruction in four dimensions supported by SBRR: (a) oral language (i.e. vocabulary development), (b) phonological awareness (i.e. the ability to attend to the sounds of speech as distinct from its meaning), (c) print awareness (i.e. early visual/orthographic knowledge), and (d) alphabetic knowledge (i.e. ability to identify and naming the letters of the alphabet) (see Snow et al., 1998; Christie, 2008). SBRR suggests that successful acquisition of these basic principles of emergent literacy lay the

foundation for later proficient reading, thereby helping to prevent later reading difficulties (Scarborough, 2002).

Screening Assessments

ERF recognizes that the early identification of children who may be at risk for developing reading difficulties is crucial (Roskos, 2007). It is necessary for teachers to monitor student progress in order to document that children are attaining goals on schedule, that children in need of extra help or opportunity are identified, and that their needs are specified (Snow et al., 1998). For effective screening and informing on individual child progress in early literacy, multiple forms of assessment must be incorporated (Christie et al., 2002). Through the use of screening tools children can be targeted for intervention and equipped with the specific skills they need, at the initial stages of difficulty (Snow, Burns, and Griffin, 1998). Efficient use of assessment tools make it possible for teachers to respond quickly with what is needed, preventing an otherwise likely path to eventual reading failure.

Despite the accumulating evidence for the benefits of high quality early childhood instruction, preschool programs continue to fail to meet the needs of those most in need, children who grow up in poverty, minority children or children's whose primary language is not English. *Early Reading First*, more than any previous effort, clearly specifies what high quality instruction should look like. Along with *No Child Left Behind Act* (2001) and *Good Start, Grow Smart*, ERF "responds to an urgent call for better early literacy instruction to prevent reading difficulties, increasingly recognized as detrimental to individual's academic well-being" (Roskos, 2007). Despite the urgency, virtually no studies have examined the short or mid-term effects of *ERF* enriched preschool classrooms on preschool children's language and literacy

outcomes in preschool and beyond. Questions remain about the stability and durability of the effects.

Study Purpose

The present study was designed to assess the effectiveness of ERF enriched preschool classrooms located in a small city, in a Southwestern state on both short- and mid-term early literacy outcomes of high risk preschoolers in a treatment condition and a comparison group. Its purpose was to determine the short and mid-term effect of an *Early Reading First* enriched programming conducted within a culturally and ethnically diverse school district.

A total of 239 children participated in the study, 110 children in the ERF treatment group and of the 129 children in the “practice as usual” contrast group. Uniformly across both groups, the majority of students came from low-income Hispanic families. Likewise, the characteristics of the two sets of teachers were relatively comparable, although fewer ERF teachers had early childhood certification.

Students in the ERF-enriched classrooms received explicit instruction in oral language, phonological awareness, alphabet knowledge, and concepts of print through the use of specified curriculums and pedagogical strategies. Teachers in these classrooms participated in professional development covering SBRR on early language, literacy, reading development, and classroom practices. The Teacher Behavior Rating Scale (TBRS; Landry, Crawford, Gunnewig, & Swank, 2001), a 63-item measure for use by a trained observer, was used to evaluate the quality ERF instruction implemented in the classrooms. Results on this measure indicated there was a high level of quality of implementation.

Children in the contrast group received the regularly available standard instructional practices in half-day preschool classrooms. All teachers used the same standard curriculum and

participated in five six-hour staff development workshops. In addition, they received one-hour weekly staff development sessions. Instruction in the contrast classrooms addressed the same skills as in the ERF classrooms, but teachers approached them in individual ways.

Participating students in both the intervention and contrast groups were administered two measures at the beginning and end of their pre-kindergarten year. The Peabody Picture Vocabulary Test III (PPVT-III; Dunn & Dunn, 1997) was administered as a measure of oral language, and the Name Writing and Alphabet Knowledge subtests of the PALS-PK (PALS Pre-K; Invernizzi, et al., 2004) were administered as measures of alphabet knowledge. In kindergarten and second grade, all students were directly assessed by the school district, with either the Texas Primary Reading Inventory (TPRI; Center for Academic and Reading Skills, 2004) if students are in regular classrooms, or the Tejas Lee (Francis et al., 2006) if students are in bilingual classrooms. Though the Tejas Lee is not a direct translation of the TPRI, both of these instruments measure the same domains: alphabet knowledge, phonological awareness, listening comprehension, and book and print awareness. Results of all measures were analyzed to gauge the short and mid-term impact of ERF classroom enriched instruction on measures of alphabet knowledge and receptive oral language, using a quasi-experimental pretest- posttest, and follow-up design.

The longitudinal effect of the ERF intervention on participating students (from pre-kindergarten through the middle of first grade) was investigated via multilevel modeling. This data analytic approach allowed for the rate of change over time on story comprehension and alphabet knowledge scores to be estimated. At the first level were individual growth trajectories. Each student's trajectory was described with an intercept (starting point) and a slope (linear rate of change). At the second level were the average trajectories, with individual and group

deviations from the average. A group factor at the second level allowed further examination of the differences in intercept and slope, informing about the impact of the intervention.

Hypotheses

- 1) Given that both the ERF and Contrast groups received curricular instruction, we expected to see growth over time in both groups on measures of both alphabet knowledge and story comprehension.
- 2) Given that both groups were comparable at baseline in terms of demographic characteristics, we predicted the starting points (i.e., intercepts) between ERF and contrast groups would not be significantly different from each other. We expected we would find no differences in intercept values at the level of testing for ERF and contrast groups.
- 3) After adding in a group factor, we expected the growth rates as captured in the slopes to be different for ERF and contrast group. We predicted the growth rate of ERF students would be greater than that of the students in the contrast group in measures of both alphabet knowledge and story comprehension.

CHAPTER II

REVIEW OF THE LITERATURE

Evidence of the importance of high quality preschool on children's later academic achievement has been growing in recent years (Snow et al., 1998). The urgency behind continued research on preschool's short and long term effects is driven by alarming national reports (e.g., National Assessment of Educational Progress, 2005), that show current performance level for 4th and 8th graders in reading and math is disturbingly low especially for low income and English language learners (Roskos, 2007). Reading ability has been shown to be especially problematic for high-risk groups like Hispanic students or students growing up in low income/poverty homes. Given that remediation of reading problems is costly, time consuming, and complex (Justice, 2006), the field has undergone a shift towards prevention and early intervention.

In efforts to promote literacy prevention research, the government commissioned unprecedented initiatives through the No Child Left Behind (NCLB, 2001) Act. Among them, the *Early Reading First* (ERF) project, part of the *Good Start Grow Smart* plan, was specifically designed to target preschool-age children at high risk for developing reading difficulties by creating preschool centers of excellence (US Department of Education, 2005). The following review will summarize research on: (a) precursors to reading, (b) Hispanics as a high-risk group, and (c) preschool's potential to address problems of high-risk students such as Hispanics. Finally, it will review the integrated components of ERF, a preschool enrichment program designed to develop and accelerate important precursors of reading achievement in young children at-risk for reading failure.

The development of literacy begins earlier in childhood than was previously understood (Snow et al., 1998). From the time they are born, children are acutely aware of their surroundings with the quality and amount of stimuli they receive having a lasting impact on their development. As they grow, every day experiences come to determine downstream abilities such as reading. Limited exposure to literacy rich environments during optimal windows of sensitivity may result in later reading difficulties. The impact of learning that takes place in early years affects a young child's ability to learn throughout their lifetime (Barnett & Yarosz, 2007).

By the time they enter school, to be prepared to learn, a child needs to have acquired fundamental knowledge of the world (Snow et al., 1998). However, not all children begin kindergarten prepared to learn (Barnett & Yarosz, 2007). Children from socio-economically disadvantaged families or diverse backgrounds are at a high risk for starting school considerably behind their more socio-economically advantaged peers (Vernon-Feaganz, et al., 2001). Hispanic children, in particular, have been found to enter kindergarten well behind their non-Hispanic peers (Denton & West, 2002). This early gap predisposes them to long-term failure given that documented evidence shows that children who begin school at a disadvantage typically continue to lag behind their peers throughout the remainder of their schooling (Snow et al., 1998). Studies consistently show that children's skills at entry to schooling are highly correlated with their skills in later years, especially in the area of literacy and reading (Snow et al., 1998). For example, in a longitudinal study, Juel (1988) found a high probability ($r = .88$) that children who were poor readers at the end of first grade would continue to read poorly by the end of fourth grade.

Preschool has great potential to address experiential deficits of disadvantaged or minority children by making sure that these children receive instruction in foundational emergent literacy and other skills that are needed for success at school entry. Indeed, the effects of a preschool education can be enduring, even beyond improved school attainment (Schulman, 2005). The long-term positive effects that can result from high quality preschool experiences include better employment prospects with decreased likelihood of a life of criminality and delinquency (Schulman, 2005). However, not just any program has the potential to produce these positive effects. The impact of an early childhood instruction on language and preliteracy skills is largely determined by the program's overall quality (for reviews see Barnett et al., 1987; Barnett, 2004). Unfortunately, the vast majority of children who receive early childhood instruction go to preschool and daycare centers where the quality of education provided is at best mediocre (Barrett & Yarosz, 2007). Children from families with lower incomes who usually have the highest need for a high-quality preschool instruction are, unfortunately, the most likely to be enrolled in a low-quality day-care facility (National Institute of Child Health and Human Development Early Child Care Research Network, 1997).

Hispanics: At Increased Risk

Hispanic children have a well-documented need for high-quality preschool instruction given their likelihood to have parents with low incomes, low English proficiency and low levels of education (Capps et. al, 2005). Today, Hispanics constitute the largest incoming immigrant group in the country, increasing at a higher rate than any other ethnicity in the United States population (U.S. Census, 2001). Even more notable, the number of Hispanic students is increasing at a faster rate than any other school-age group in the nation (National Center for Education Statistics, 2003). While people of Hispanic origin comprise about 12.5 percent of the

general population, children of Hispanic origin represent 21 percent of all children under age five (U.S. Census, 2001). In fact, the predominantly Spanish-speaking limited English proficient (LEP) population has grown 105 percent since 1990 (Kindler, 2002).

Regardless of their background, children from families with lower incomes have consistently scored lower on the National Assessment of Educational Progress (NAEP) assessments, (NAEP, 2007). Also known as “the nation’s report card,” NAEP was created in 1969 by the U.S. Department of Education with the purpose of measuring the nation’s academic progress. NAEP reading assessments are administered periodically to random samples of students ages nine, 13, and 17 across the nation. While NAEP reading results across groups have generally been low, the performance of Hispanic students has been particularly poor relative to their Caucasian peers. In 2007 approximately 50% of Hispanic children in fourth grade scored below the basic levels in reading performance, compared with only 22% of non-Hispanic Whites. In other words, 78% of White children could read beyond the basic level, with only 49.5% of Hispanics students being able to do so.

Growing up Hispanic and in poverty in the United States is arguably associated with numerous risks that have a negative impact on school readiness. Specifically, research has shown that poverty is associated with malnutrition, low maternal education, high maternal stress, limited access to resources (including quality childcare and healthcare services), and lack of social support (Snow et al., 1998). Children who grow up in poverty get caught in this cycle of unfavorable conditions, with each condition leading to cumulative negative outcomes (Barnett & Yarosz, 2007). Poor Hispanic children tend to demonstrate fewer abilities when they first begin school, including delayed letter knowledge, phonological sensitivity, oral language, and knowledge about print (Snow et al., 1998). Low English proficiency constitutes a further risk

factor in an already dismal picture. Not only do these children have to learn a new language with efficiency, but also master the content. Without explicit oral language support early on, Hispanic children whose first language is not English frequently show poor proficiency in both English and their native language (Laosa & Ainsworth, 2007).

As a function of cumulative risk, the academic success of large numbers of Hispanic children is imperiled. There is, however, hope. Studies have demonstrated that school readiness of Hispanic children can indeed be enhanced through high-quality preschool experiences (Gormley, Gayer, Phillips, & Dawson, 2005; Johnson & Walker, 1991; Puma et al., 2005). Evaluations of state programs, Head Start, and the national Early Childhood longitudinal study (ECLS-K) consistently show that not only do Hispanic children benefit from preschool education as much as children from other backgrounds, but in some cases the gains they make are even greater (Laosa & Ainsworth, 2007).

Parents of Hispanic children support and want to enroll their 4-year-olds in preschool, but in large numbers do not do so. A national survey found that 75 percent of Hispanic parents considered preschool attendance “very important,” and 95 percent believed that preschool instruction is an advantage for later school success (Perez & Zarate, 2006), yet Hispanic children are the least likely to attend preschool. Often, Hispanic parents lack awareness or information about programs or resources in their communities. In effect, lack of access is one of the most important barriers between Hispanic families and high quality early childhood programming. (Barnett & Yarosz, 2007; Perez & Zarate, 2006).

To summarize, national reports document a disparity in reading achievement between Hispanic students and their Caucasian peers. Given that Hispanic students often come from families with low income, low educational levels and low English proficiency, from the

beginning this group is at high risk for academic failure. While studies have found that Hispanic students' school readiness can be enhanced through high-quality preschool programming, young Hispanic children are among least likely to receive such services despite their availability.

These findings have contributed to increased interest among researchers and policymakers on how to expose Hispanic and other high risk young children to the high-quality preschool programming they need. Researchers have developed early reading programs that support the notion that preschool can mitigate against the effects of poverty. There is ample evidence that children's early exposure to high quality language and literacy skills can positively impact their later reading achievement (Christie et al., 2002). With this knowledge, policymakers have initiated and supported important early literacy policies that to date, have changed the way instruction and content in early childhood is delivered (Christie et al., 2002).

Preschool and Standards-Based Reform

One of the most important changes early childhood education has experienced is support for and adoption of preschool standards or guidelines (Christie et al., 2002). Increasingly, there has been a need to specify curriculum content and goals of early education pedagogy (Strickland & Riley-Ayers, 2006) to ensure quality programming. According to Kendall and Marzano (2004) the three main reasons for the development and use of standards are: (a) to establish clarity of curriculum content, (b) to raise expectations for the achievement of all children, and (c) to ensure accountability for public education. Standards may also include specific instructional practices and structure of the program (Strickland & Riley-Ayers, 2006).

The reform movement took shape two decades ago, when the National Commission on Excellence in Education warned that the increasing mediocrity in American students' achievement set the nation's future at risk (National Commission on Excellence in Education,

1983). To help ensure high quality education, it recommended the establishment of high and rigorous standards (Christie et al., 2002). In response, policymakers created several initiatives to directly deal with early reading (Roskos, 2007). One of the more prominent initiatives was the No Child Left Behind Act of 2001, which was designed to improve overall school success, especially for low-income students and diverse learners (US Department of Education, 2001).

Part of the NCLB act, the *Good Start, Grow Smart* (GSGS) initiative was created to prepare young children to begin school ready to learn (Christie et al., 2002). Three prominent domains addressed by the GSGS initiative were strengthening Head Start, partnering with states to improve early childhood education, and providing relevant and useful information to parents and teachers. Notably, partnering with states to improve early childhood education involved asking states to develop quality criteria for early childhood education, including voluntary guidelines in pre-reading language that aligned with their K-12 standards.

Early Reading First: Enriching Preschools

As part of the *Good Start, Grow Smart* plan, *Early Reading First* (ERF) was created in 2002 to focus on providing young children with the foundational skills they need to begin school prepared to learn. ERF is a discretionary grant program, authorized under Title I, Part B, Subpart 2 of the Elementary and Secondary Education Act (ESEA) as reauthorized by NCLB. ERF predominantly targets children at risk for school failure due to poverty, disabilities, and low English proficiency (Roskos, 2007). The program aims to provide high quality early education to preschoolers. ERF operates by supporting enrichment of existing preschool programs into classrooms of excellence that adopt scientifically-based reading research (SBRR) principles and practices as components of their programming. The instruction provided through ERF enriched

programs is designed to equip young children with the prerequisite language, cognitive and early reading skills that help prevent reading difficulties in the long run (Christie et al., 2002).

The four main goals of Early Reading First are: (a) support local efforts to enhance the early language, literacy, and prereading development of preschool-age children, particularly those from low-income families through strategies based on SBRR, (b) provide preschool-age children with cognitive learning opportunities and skills necessary for optimal reading in kindergarten and beyond, (c) provide language and literacy activities that support age-appropriate development of oral language, phonological awareness, print awareness, and alphabetic knowledge, and (d) use screening assessments to identify preschoolers who may be at risk for reading failure (Christie, Enz & Vukelich, 2002; U.S. Department of Education, 2002). To accomplish these goals, the four components discussed below are established as the framework of ERF.

ERF Component #1- Teacher Professional Development

Studies have found that preschool quality has a larger impact on the learning and development of underprivileged children than on their more advantaged peers (for a review see Barnett, 2004). Unfortunately, children from disadvantaged families are also likely to be assigned to teachers that are poorly prepared to deal with diverse learners (for a review see Evans, 2004). Typically, personnel in low-resource early childhood settings are underpaid, minimally educated, and work in what is considered a “low-status profession” (Dickinson, McCabe, & Essex, 2006, p.12). For example, a national qualitative study found that teachers in low-income early childhood centers tended to speak to these children more dictatorially (e.g. using verbal commands more often) and with less cognitive sophistication (e.g. seldom directing questions that require answers) than do staff in higher-income centers (Ferris Miller, 1989).

Given that children from low-resource families have the greatest need for high teacher quality, the issue bears scrutiny (for reviews see Evans, 2004; Barnett, 2004).

Given the recent emphasis on standards and accountability, teachers are increasingly expected to deliver high-quality instructional content in the classroom (Garet et al., 2001). While most teachers uphold educationally high standards, many lack training on the provision of high standards-based practices and principles (Walpole & Meyer, 2008; Garet et al., 2001). To address this, ERF enriched programs require teachers be provided with high quality professional development to enhance their knowledge about scientifically-based language and early reading research, as well as scientifically-based instructional practices (Christie et al., 2002), all consistent with the reform zeitgeist.

For teachers, ERF outlined the knowledge and skills essential in early literacy instruction (Strickland & Riley-Ayers, 2006). Examples included: (a) teacher understanding of the degree to which their everyday verbal and literacy-related interactions impact the development of children's reading abilities, (b) knowledge about how to promote a wide range of language and literacy related competencies, including vocabulary, oral language abilities, phonological awareness, and print-related knowledge, and (c) how to adapt instruction to meet children's individual needs, as well as assessment administration and results interpretation (Strickland & Riley-Ayers, 2006). In order to help develop these abilities, ERF requires professional development programming to be rigorous, continuous, and classroom-centered, using collaborative activities and hands-on training (Mashburn, 2008).

ERF Component #2- High Quality Language and Print-rich Environment

An important dimension of ERF is to provide a literacy-rich environment with plentiful materials to support children's learning (U.S. Department of Education, 2001). This is because

research shows that a well-designed classroom environment where children have access and are exposed to abundant print is essential for helping them learn about language and literacy (Christie et al., 2002).

Print-rich, high quality classroom environments include plenty of age-appropriate books, a practical yet comfortable area for reading and writing, purposeful print, displays of children's writing, and book-related props in play areas. High quality classroom environments promote children's engagement in talking, listening, reading, and writing to one another (Christie et al., 2002).

In addition to abundant print and vocabulary, high quality classroom environments possess favorable teacher-child ratios. Lower teacher-child ratios, and no more than twenty students per classroom (Barnett & Frede, 2010) allow teachers and students to interact more often, increasing the amount and quality of children's verbalizations, which is critical for vocabulary growth (Dickinson, McCabe, & Essex, 2006). Having fewer children not only increases the opportunities teachers have for conversing with each individual student, but also allows them to address special needs and promote more interaction between and among students (Dickinson, McCabe, & Essex, 2006).

ERF Component # 3- Scientifically Based Reading Research (SBRR)

Preschool children are in the pre-reading stage, and therefore instead of teaching conventional forms of reading, research shows that interventions during this period must target emergent literacy skills (Whitehurst & Lonigan, 1998). Emergent literacy involves the knowledge and skills that precede conventional forms of reading and writing (Whitehurst & Lonigan, 1998). Appointed by the U.S. Department of Education, the Committee on the Prevention of Reading Difficulties in Young Children (Snow et al., 1998) identified four

emergent literacy knowledge and skills that have consistently been shown to be predictive or highly correlated with future reading achievement. The four early literacy skills found to be the basic building blocks for learning to read and write and adopted by ERF are: (a) oral language, (b) phonological awareness, (c) print awareness, and (d) alphabet knowledge. Combined, successful acquisition of these basic skills prepares the majority of students to move from learning to read to reading to learn (Scarborough, 2002).

Oral language. Although models vary, generally oral language is thought to consist of at least four main skills: vocabulary, phonology, syntax, and discourse (Troia, 2004). While all these aspects of oral language matter, due to its well-documented prominence, only vocabulary will be addressed in the present review. Deficits in vocabulary constitute an important early risk factor that significantly increases the likelihood of reading failure (Snow et al., 1998). Early vocabulary abilities have been shown to predict other key emergent literacy skills such as phonological awareness, letter knowledge, and concepts about print (Troia, 2004). In their seminal study Hart and Risley (1995) showed that children of lower socio economic status receive on average less overall exposure to vocabulary and less frequent encouragement to speak. Hart and Risley further documented that by age four, children from higher socio-economic families have been exposed to 45 million words, whereas children from lower socio-economic families have only been exposed to 13 million words, a 32 million-word gap. These differences in exposure to language during early childhood have a strong and persistent negative influence on later reading and school achievement, and constitute a significant disadvantage in the acquisition of important precursors to reading.

Improving children's oral language abilities before they begin kindergarten may have a far-reaching impact on future academic achievement (Biemiller, 2003). Studies have found that

children's oral language skills in kindergarten predict their reading comprehension skills in third grade and beyond (Storch & Whitehurst, 2002; Biemiller, 2003). A longitudinal study of young children's exposure to language in their homes and child-care settings found that measures of receptive vocabulary and oral language taken in kindergarten are predictive of reading comprehension in the fourth and seventh grades (Tabors, Snow, & Dickinson, 2001). While vocabulary knowledge does not guarantee reading success, lack of vocabulary knowledge can reliably predict failure (Biemiller, 2003).

Phonological awareness. The ability to grasp and manipulate the sound structure of language is another aspect of early literacy that has been shown to be associated with later reading success (Dickinson, McCabe, & Essex, 2006). Phonological awareness, "an individual's awareness of the sound structure of speech" (Christie, 2008, p. 33), is a meta-skill that develops across an extended period of time, from the beginning of preschool through the first years of elementary school (Troia, 2004). This ability can be measured through activities such as rhyming, matching initial consonants and sounds, and counting the number of phonemes in spoken words (Stahl & Murray, 2006).

An advanced stage in the phonological awareness ladder is phonemic awareness, a finer grained sensitivity that includes the understanding that spoken words are made of phonemes, or units of sound (Christie, 2004). All skilled readers do not necessarily demonstrate phonemic awareness (Scarborough et al., 1998); however, lack of phonemic awareness is known to be an indicator of future reading problems. In fact, the inability to segment words and syllables into component sound units is the best predictor of reading difficulty in kindergarten or first grade and beyond (Lyon, 1995). Children identified with reading disabilities predominantly display slow and inaccurate decoding, which is generally attributable to a core phonological awareness

deficit (Troia, 2004). Phonological processing difficulties affect decoding and fluent word recognition, thereby compromising reading comprehension skills (Troia, 2004). No direct causal link between phonological awareness and success in learning to read has been established (Castles & Colheart, 2004), but the evidence of a correlational relationship is ample (Stahl & Murray, 2006; Whitehurst & Lonigan, 1998). In fact, measures of phonological awareness in preschoolers predict early reading ability better than intelligence scores, age, and measures of socio-economic status (Stahl & Murray, 2006).

Children from lower socio-economic backgrounds demonstrate lower phonological awareness skills than children from families with more resources (for review see Phillips, Menchetti & Lonigan, 2008). Teaching young children how to manipulate speech sounds significantly improves their emergent literacy skills (Troia, 2004). Preschool-aged children, even those from high-risk backgrounds can successfully be trained in phonological awareness and letter-sound associations (for a review see Snow et al., 1998). Brady and colleagues (1994) conducted a longitudinal investigation of a phonological awareness-training program, and found that children in the treatment group made significantly greater gains in phonological awareness and significantly better chances of being promoted to first grade. More recently, Fuchs and colleagues (Fuchs et al., 2001) investigated the effects of a phonological awareness teacher-training program on student outcomes. This investigation also found that children in the treatment group outperformed those in the control group on measures of phonological awareness.

Alphabetic knowledge. The third essential skill of early literacy instruction targeted by ERF is the ability to distinguish and name the letters of the alphabet. Alphabet knowledge has also been found to be predictive of later reading ability (Christie, 2008). There are two sub-skills underlying alphabet knowledge, namely, identification and naming (Christie, 2008).

Identification involves the ability to recognize a letter uttered by another person. Of the two, naming is a higher skill, and requires verbalization of a letter that someone else points to (Christie, 2008). Preschoolers from low-income families, particularly those with low maternal education, often demonstrate fewer letter-naming skills than children of higher income homes and with better-educated mothers (Molfese et al., 2006).

Interventions that focus on a literacy-enriched learning environment have been shown to effectively improve preschoolers' alphabet knowledge (Justice & Pullen, 2003). For example, Neuman and Roskos (1993) investigated the effects of a literacy-enriched play intervention for low-income preschoolers and found positive performance changes, particularly in alphabet knowledge and environmental print recognition. In another randomized study of a 15-week intervention, Vukelich (1994) found that exposure to a knowledgeable adult during play in a print enriched-setting significantly improved preschoolers' letter knowledge skills.

Print awareness. The print awareness domain, sometimes referred to as “concepts of print”, principally involves children’s early development of visual/orthographic knowledge (Levy et al., 2005). Children begin developing this area well before they begin learning to read, and it involves children’s understanding that spoken language can be represented by print. Around age four, preschoolers start paying attention to print and begin perceiving that writing involves a series of abstract conventional rules. Quickly, children become aware that writing is different from drawing (Levy et al, 2005). An important aspect of print awareness is emergent writing, which involves invented print (Whitehurst & Lonigan, 2001). Creating scribbles or other marks on paper and then pretending to decipher them indicates that while the child has not yet learned to write he or she understands that print carries meaning (Whitehurst & Lonigan, 2001)

Print awareness also involves children's understanding of a range of other concepts of print, such as book conventions (title, author, illustrator, front/back of book, etc), how various texts are organized (left to right, top to bottom), and understanding that letters and words are distinct and identifiable forms of print (Christie, 2008). Studies have found a correlation between preschooler's print knowledge and later reading (for review see Snow et al., 1998). Knowledge of concepts of print can be transmitted through print referencing strategies such as shared reading of storybooks, shared writing, as well as through more direct forms of instruction (Christie, 2008). For example, in an investigation of an intervention strategy designed to provide parents of Head Start students with literary opportunities and materials, Neuman (1996) found that children of participant parents significantly improved their understanding of concepts about print, regardless of the parent's reading proficiency level. This suggests that, consistent with Vygotsky's (1978) zone of proximal development, exposure to literacy-related activities stimulates aspects of children's emergent literacy, including print awareness.

ERF Component # 4- Screening Assessments

One of the most important steps in the prevention and early intervention of academic problems is the early identification of children who may be at risk for developing a learning problem (Schatschneider, Petcher, & Williams, 2008). Screening, as used in ERF, refers to a process by which students are universally assessed to identify risk status (Schatschneider, Petcher, & Williams, 2008). Students at risk for various types of difficulties can be identified through the use of early, appropriate screening processes (Paris, 2006). Children who are in the preliminary stages of future reading failure can be targeted through the use of screening tools and then be provided with additional differentiated instructional practices followed by more formative forms of progress monitoring (Schatschneider, Petcher, & Williams, 2008). Early

Reading First incorporates multiple forms of assessment for informing on individual child progress in early literacy (Schatschneider, Petcher, & Williams, 2008). ERF requires use of screening and progress monitoring assessments for the four guiding principles of early literacy: oral language, phonological awareness, print awareness, and alphabetic knowledge.

Research on Early Reading First

The NCLB Act mandated an independent national evaluation of the ERF program and required a final report to Congress (Jackson et al., 2007). This final report assesses, on a national level, the impact of the program on the language and literacy skills of children and the instructional content and practices in preschool classrooms. The main findings of the national evaluation of ERF were that: (a) the program had a positive impact on several classroom and teacher outcomes as well as on two of four child outcomes measured, (b) effects of the program were similar across ethnic groups as well as in terms of English proficiency level.

There were several dimensions in which ERF enrichment had a positive impact. To begin with, teachers received increased number of hours of professional development, as well as “coaching” as a method of training. Classroom environments and teacher practices were enhanced. More specifically, gains were shown in the amount and quality of language in the classroom and in the materials and teaching practices to support print, letter knowledge and writing. Book reading practices were implemented, as well as a variety of phonological-awareness activities. In addition, a greater variety of up-to-date child assessment practices were adopted. Other areas on which ERF was reported to have a positive impact were the quality of teacher-child interactions, the classroom organization, and the planning of activities for children. These improvements did not, however, translate to positive outcomes for all child domains. ERF was reported to have a statistically significant positive impact on children’s print and letter

knowledge but not on phonological awareness or oral language- two critical precursors to reading. Children's social-emotional development was neither enhanced nor diminished through the intervention. Finally, patterns of impact were similar across Hispanic, white non-Hispanic, and black non-Hispanic children. Patterns of result were also similar for English language learners (ELLs) and native English speakers.

In the only known published empirical study to date, Martin, Emginger, Snyder, and O'Neal, (2007) provided an independent investigation of an ERF enriched program targeting a small southeastern city with a large proportion of low-income, mainly African American families. The investigators used the Peabody Picture Vocabulary Test-III (PPVT-III: Dunn & Dunn, 1997) to measure receptive vocabulary and for screening verbal ability; the Initial Sounds Fluency (ISF) and Letter Naming Fluency (LNF) subtests of the Dynamic Indicators of Basic Early Literacy Skills (DIBELS: Good & Kaminski, 1996) to measure phonemic awareness; and the Language and Emergent Literacy Assessment (LELA) to assess letter recognition, book knowledge, beginning sounds, phonemic awareness, and rhyming. Consistent with the national evaluation report, gains in the treatment group were statistically significant for letter naming fluency, but not for oral language.

Summary and Purpose of Study

National reports call attention to the perilous reading achievement levels of many students, but especially for Hispanic students. Children from families of low socio-economic status and low English proficiency are at high risk for academic failure, particularly in the area of reading. Given the rapidly growing numbers of low-income Hispanic students in this country, it is crucial to target for early intervention this population of children. A wealth of literature supports the notion that high quality preschool instruction targeted at Hispanic children at-risk

for reading failure increases their school readiness, thereby improving their likelihood of accruing cumulative positive academic outcomes (Laosa & Ainsworth, 2007).

Early Reading First is a federal initiative that seeks to incorporate all of the elements supported by scientifically-based reading research into a preschool program designed to address the present and future reading gaps of high-risk young Hispanic children. Ideally, ERF attempts to achieve its goals by requiring professional development, high-quality language and print-rich environment, use of scientifically-based reading research, and the informed use of appropriate assessment measures.

The purpose of the present study was to investigate whether providing students with exposure to literacy activities specified in Early Reading First enrichment generates short and mid-term effects that are stable over time. Specifically, this study followed and documented the performance of a cohort of preschool students who were enrolled in an ERF enriched preschool during the 2005-2006 school year, through kindergarten and the middle of first grade. This investigation involved two groups of children: an ERF group and a contrast group. Results of assessments provided as part of ERF (PPVT and PALS) were tracked using the kindergarten, and first grade versions of the school district administered the Texas Primary Reading Inventory (TPRI) and its Spanish adaptation, the Tejas Lee, scores during the 2007-2008 and 2008-2009 school years.

CHAPTER III

METHOD

Participants

The present study was conducted using multilevel modeling to evaluate the performance of the ERF and the contrast group of children in preschool through first grade. A total of 239 preschool children from two multiethnic schools from the same school district in a Southwestern state participated in the study. Of these, 110 were enrolled in the second year (2006-2007) of a 3-year ERF project. The contrast group consisted of 129 preschoolers who attended preschool the same year at a different campus and received regularly available standard instructional practices in half-day preschool classrooms. Table 1 summarizes the demographic characteristics of children who were included in any of the initial preschool analyses reported in the results section. Demographically, both groups were quite similar.

Table 1

Demographic Characteristics of ERF and Contrast Children

	Sex		Ethnicity			SES		Student Language	
	Male	Female	Hispanic	African-American	Caucasian	Free Lunch	Reduced Lunch	Monolingual English	ELL
ERF (<i>n</i> = 110)	47	53	85	13	2	80	20	39	61
Contrast (<i>n</i> = 129)	52	48	82	12	6	86	14	29	71
χ^2	.03		1.86			1.97		2.45	
<i>p</i>	.86		.40			.16		.12	
Cramer's <i>V</i>	.01		.09			.09		.10	

Preschool children participating in the study later attended kindergarten and first grade in 15 schools across the same ethnically and culturally diverse school district. A large proportion (46%) of the students enrolled in the district were of Hispanic descent. More specifically, 77% of all students in the ERF enriched school and 63% of all students in the contrast school were categorized as Hispanic. Over 90% of students in both schools qualified for free or reduced lunch program.

Teachers

Table 2 summarizes the characteristics of the teachers participating in the ERF project and contrast school. As shown, the characteristics of the two sets of teachers were relatively comparable, although fewer ERF teachers had early childhood certification (2 of 8 vs. 5 of 5).

Table 2

Teacher Characteristics Year 2

Teacher Characteristic	ERF Teachers (<i>n</i> = 8)	Contrast Teachers (<i>n</i> = 5)
Mean Years Teaching	3.5	4.0
Mean Years at Present School	2.0	4.0
Early Childhood Certification	2	5
Bilingual Certification	2	3
Special Education Certification	2	0
English as a Second Language	0	1

Early Reading First Classrooms

Federal ERF Program Objectives

Students in the ERF enriched classrooms received integrated instruction in the four areas identified in the *Guidance for the Early Reading First Program* document (U. S. Department of

Education, 2008): oral language, phonological awareness, alphabet knowledge, and concepts of print. The curriculums, instructional content, and pedagogy were selected to prepare children to enter kindergarten with the language, cognitive, and pre-reading skills necessary for success in kindergarten. Classrooms were organized to provide cognitively stimulating opportunities using high-quality language and print-rich environments.

Teacher Training

The ERF teachers and teachers' aids participated in an average of 76.6 hours of professional development during the 2006-2007 academic year. The professional development was organized around scientifically-based reading research (SBRR) on early language, literacy, reading development and classroom practices. Professional development efforts focused on instructional content and pedagogy aligned to state Pre-K guidelines. Goals of the staff development included increasing teachers' conceptual knowledge and understanding of SBRR, enhancing understanding and implementation of language and literacy curriculums and strategies, improving instructional practices, and accelerating the vocabulary, background knowledge, and literacy of preschoolers. Professional development engaged teachers in collaborative study of theory and concepts underlying literacy so they could develop a deeper understanding of critical preschool literacy skills. Teachers were provided with multiple opportunities to learn about, reflect upon, and apply their professional development and understanding of the connection of professional development to student outcomes. Four primary areas were targeted for the professional development: (a) knowledge and understanding of preschool language and literacy skills necessary for successful entry to kindergarten, (b) administration and use of screening and progress monitoring assessments to inform instructional

decisions, (c) curriculum-specific knowledge and implementation, and (d) appropriate use of differentiated literacy and language instruction for preschoolers.

The content and format of the professional development included workshops, one-to-one classroom coaching, small-group coaching sessions, coaching via video clips, on-line mentoring, and classroom observation by peers. In addition, the *Scholastic Early Childhood Program* (SECP: Block, Canizares, Church & Lobo, 2008) and *Building Language for Literacy* (BLL: Neuman, Snow & Canizares, 2008) curriculums included a series of 12 customized integrated teacher workshops designed to facilitate discussions with the teaching team on research-based topics by noted experts in early childhood. Professional development was integrated into SECP's, *My Guide for Ongoing Assessment and Professional Development*. Teachers also participated in teacher study teams using reflection guides developed for each workshop topic. The study teams were used to engage teachers in the collaborative aspects of scientific inquiry into their professional development. In addition, Early Reading First teachers were supported by a literacy coach who provided mentoring and support using a modified "peer coaching" model developed by Showers and Joyce (1996). The coach provided one-to-one, small group, and whole group staff development on SBRR strategies tailored to the needs of the ERF teachers. The coach demonstrated effective strategies to address the four core ERF targets of instruction, expertise on norm, criterion-referenced, benchmarking, progress monitoring and other outcome assessments and served as a liaison to administration and evaluators on assessing the ERF program.

Classroom Instruction

The ERF project employed a multi-tiered framework (Fuchs & Fuchs, 2006; Fuchs, Mock, Morgan, & Young, 2003; Gresham, 2007). Multi-tiered frameworks require educators to

provide early intervention, differentiated instruction matched to student needs, and progress monitoring with ongoing data-based decision making (Vaughn, Linan-Thompson, & Hickman, 2003). The multi-tiered framework included: (a) developing at-risk criteria, (b) screening to identify those students most at risk of not meeting preschool oral language benchmarks, (c) monitoring progress to Tier I instruction for all students including those identified as high risk, (d) maintaining fidelity of Tier I instruction using the Teacher Behavior Rating Scale (Assel, Landry, & Swank, 2008), (e) regular progress monitoring to assess responsiveness to the core curriculum, (f) identifying students in need of Tier II, (g) monitoring Tier II responsiveness to instruction, and monitoring students in need of Tier III (McMaster & Wagner, 2007). The school employed three successively more intensive program tiers structured around the pedagogy associated with developmentally-appropriate curriculum materials, effective instruction methods, and attention to cognitive and affective skill development and growth.

In Tier I, all preschool students were screened using the Peabody Picture Vocabulary Test-III (PPVT; Dunn & Dunn, 1997) to identify those at risk for language and literacy difficulties. Students below 25% were considered at highest risk. Student responsiveness to regular classroom instruction was monitored using teacher-administered district-developed “Smart Goals” progress monitoring probes. After six weeks of instruction, teachers compared students in their classrooms to district-developed “Smart Log” benchmarks on alphabet knowledge, phonological knowledge, oral language and book and print awareness. Those students unresponsive after six weeks to SECP were provided with an additional 30 minutes of daily pull-out small group intensive, systematic and explicit instruction in Tier II in addition to the Tier I. Trained language technicians delivered instruction to small groups of no more than four to five students. After another six weeks, students were assessed using the “Smart Goals”

probes. Those students who did not make sufficient progress in Tier II moved on to a combination of more intensive Tier I and II programming provided by the language technicians in one-to-one or groups of no more than a three preschoolers to one language technician.

The *Scholastic Early Childhood Program* (SECP), the core Tier I curriculum, is a class-wide curriculum selected to address the majority of the children's language and literacy needs through its focus on language and literacy, integration with mathematics, social studies, arts, physical development, and personal and social development (Block et al., 2008). The program is a comprehensive, year-long curriculum that combines child-centered explorations with explicit teacher-directed instruction and ongoing formal and informal assessment. It also includes English and Spanish resources and provides activities for families to extend the learning day. The SECP provides language and early literacy lessons that develop oral language, phonological awareness, print awareness and alphabetic knowledge by immersing children in quality language and literacy centers. Language and vocabulary are developed in the context of themes, concepts, and varied children's literature. The SECP core curriculum was supplemented with *Let's Begin with the Letter People* (Abrams & Company, 2000). *Let's Begin with the Letter People*® is an early education curriculum that uses thematic units to develop children's language and literacy skills. A major focus is phonological awareness, including rhyming, word play, alliteration, and segmentation. Children are encouraged to learn as individuals, in small groups, and in a whole-class environment.

Building Language for Literacy (Neuman et al., 2008) the Tier II curriculum, is a research-based intensive program specifically focused on systematic letter/sound instruction, writing, and reading of high frequency words for students who are not making adequate progress in Tier I. Oral language activities included extended vocabulary, contextual use of speech and

syntax, and oral comprehension abilities (Beals, 1997; Beck, McKeown, & Kucan, 2002; Biemiller, 1999, 2003). Phonological awareness activities emphasized more intensive rhyming, songs, poems, games, segmenting of words into syllables, isolating initial and ending words, and blending individual phonemes. *Building Language for Literacy* was provided via a 30-minute pullout program, five days a week for the full year and generally consisted of small groups of three students to one language technician. The program also included English as a second language (ESL) strategies suited for all preschoolers identified as English language learners (ELL).

Tier II also included *Pebble Soup* (Harcourt Supplemental Publishers, 2008) for ELL preschool children who were in need of more intensive intervention targeted at age-appropriate instruction in oral language development, listening comprehension, vocabulary and verbal expression. *Pebble Soup* is organized around a series of English and Spanish topics that focus on real world themes that are interesting to young children. Built around “*Explorations*” of themes, each exploration includes books, audiotapes with animated character voices, posters, alphabet picture and letter cards, engaging manipulatives, and computer-based CD-ROMs. A *Pebble Soup* handbook and cards assist teachers in scaffolding activities and guiding children’s interests around oral and written language. In Tier III, students not making adequate progress in Tier II were exposed to an additional 30 minutes of intensive small-group instruction using Tier II and Tier III materials.

Quality of Treatment Implementation

The Teacher Behavior Rating Scale (TBRs; Landry, Crawford, Gunnewig, & Swank, 2001) was used to evaluate the extent to which the ERF program was implemented in the classrooms. The TBRs is a 63-item measure used to assess features of preschool classrooms and

instruction that promote general language and literacy development. Items with 3-point and 4-point Likert scales measure quantity and quality, respectively, of each characteristic. The TBRS was designed for use by a trained observer and can be completed in a three-hour classroom observation (Assel, Landy, & Swank, 2008). Subscales of the TBRS include Classroom Community, Sensitivity, Lesson Plans/Dynamic Assessment/Portfolios, Centers, Book Reading Behaviors, Print and Letter Knowledge, Math Concepts, Phonological Awareness, Written Expression, Oral Language Use with Students, Team Teaching and Total Scale. Reported validity coefficients range from .25 to .98. Coefficient alpha reliability coefficients range from .63 to .97 (Landry et al, 2001).

Because of the high correlations between the quality and quantity dimensions in the TBRS (from .74 for Lesson Plans/Dynamic Assessment/Portfolios to .99 for Language Use) (Jackson et al., 2007) items were averaged to create single-item and subscale score. The resulting subscale averaged across all ERF enriched classrooms, were .89 for Lesson Plans/Dynamic Assessment/Portfolios, .95 for Centers, .79 for Book Reading Behaviors, .93 for Print and Letter Knowledge, .80 for math concepts, .72 for Phonological Awareness, .94 for Written Expression, .91 for Language Use, and .83 for Team Teaching, indicating a high level of quality of treatment implementation of ERF program components.

Contrast Classrooms

Teacher Training

Teachers in the Contrast school used standard preschool instructional practices adopted by the school district. All teachers used the *Scholastic Early Childhood Program* (SECP) as the standard curriculum (Block et al, 2008). The teachers participated in five half-days of staff development before the start of the 2006 academic year with one additional full day of staff

development at the end of the academic year. The content of the staff development consisted of five six-hour workshops covering a continuum of meaning-based and skill-based instructional approaches aimed at enhancing children's cognitive, language and early reading development, particularly low income and English language learners.

Contrast teachers also received weekly, one-hour staff development sessions led by the school principal or other administrative or curriculum staff. The aim of each session was to assist teachers in making informed decisions about: (a) curriculum content, (b) accommodations and modifications for children with disabilities, (c) strategies for ELL children, (d) design of print-rich classroom settings, and (e) thematic units that link language, reading and writing.

Instruction

Instruction in the Contrast classrooms addressed the same general skills as in the ERF classrooms, but different teachers approached them in individual ways. There was no literacy coach, nor was there a formal home visiting program. Parents were, however, invited to attend three family literacy nights. The aim of the family literacy nights was to help parents promote the use of shared-reading and other language and literacy activities in the home.

Measures

The ERF program used instructionally relevant assessments to screen and monitor preschool student progress in developing the language and literacy skills needed for later reading success. For the purpose of this study, the same instruments were administered to children in the contrast group. Students were individually screened in the Fall of 2006 and Spring of 2007 using the Peabody Picture Vocabulary Test-III (Dunn & Dunn, 1997) and the Name Writing and Alphabet Knowledge subtests of the Pre-kindergarten Phonological Awareness Literacy Screen (Pre-K PALS: Invernizzi, Sullivan, Meier & Swank, 2004). All measures were individually

administered by trained university graduate students and school personnel and teachers. Each test protocol was scored twice, once by the individual who conducted the initial assessment and a second time by another examiner or project member. Any discrepancies in scoring were resolved through a third examiner or a senior project investigator. A second data entry specialist reviewed the data-base for entry errors and resolved any differences with the primary data entry specialist. All data collectors received training prior to data collection that included time for practice to mastery.

Phonological Awareness Literacy Screening Pre-K

The Phonological Awareness Literacy Screening Pre-K (PALS Pre-K; Invernizzi, et al., 2004) is a scientifically-based phonological awareness and literacy screening that measures preschooler's developing knowledge of important literacy fundamentals and offers guidance to teachers for tailoring instruction to children's specific needs. In the evaluation of this ERF program, the Pre-K PALS Alphabet Knowledge subtest was used. In this subtest, the teacher asks the child to name the 26 upper-case letters of the alphabet presented in random order. The subtest takes approximately 5 minutes to administer.

Peabody Picture Vocabulary Test, Third Edition Form A

The Peabody Picture Vocabulary Test (PPVT-III; Dunn & Dunn, 1997) is recommended for use in educational and clinical settings to measure receptive vocabulary and to screen for English language ability and general language development. On the PPVT-III, the child is required to point to one of four pictures on a panel that represents an object or action named by the examiner. The test consists of 204 progressively more difficult items, recommended for ages 2 through 99 and generally takes 10-15 minutes to administer. Scores are age-based standard

scores ($M = 100$, $SD = 15$). Reported alpha and split-half reliability coefficients are in the range of 0.86 to 0.98 for both forms A and B (Dunn & Dunn, 1997).

Texas Primary Reading Inventory (TPRI).

The kindergarten Texas Primary Reading Inventory (TPRI; Center for Academic and Reading Skills, 2004) is an individually administered reading skills assessment for grades kindergarten through second grade. The purpose of the TPRI is to provide a quick means for teachers to identify children who are at high risk for reading difficulties and provide differentiated instruction to meet specific student needs. The TPRI is administered at beginning of the year (BOY), mid-point of the year (MOY), and end of the year (EOY). The measure is divided into Screening and Inventory sections. The Screening section purpose is to differentiate students who may have additional instructional needs from those students who have fully developed the skills necessary for successful reading in first grade and beyond. The Inventory section of the TPRI provides additional information that can assist teachers in planning effective instruction for students with developing skills. Branching rules determine which subtests are individually administered to students. All kindergartners take Graphophonemic Knowledge (GK). The GK subtest consists of a list of 26 upper and lowercase letters that the student is asked to identify by name. To be considered developed, the student must score 20 or more correct. If they score less than 19 correct, the student is routed to a second GK sound-symbol relationship task; otherwise the student is routed directly to Story Comprehension. Story Comprehension consists of a choice of two stories. The teacher reads the passage followed by explicit and implicit knowledge comprehension questions. Cronbach alpha reliabilities of the kindergarten TPRI are .43 for Story Comprehension and .96 for Letter Name Identification (TPRI; Center for Academic and Reading Skills, 2004).

Tejas Lee

Like the TPRI, the Spanish-language *Tejas Lee* (Francis et al., 2006) is an individually administered reading skills assessment that provides a comprehensive overview of Spanish reading and reading growth from kindergarten through third-grade. It assists teachers in matching reading instruction with student needs, identify strengths and areas of concern, and monitor student progress over time so that student can meet targeted grade-level reading goals. Use of the *Tejas Lee* is recommended for students with limited English proficiency, enrolled in dual language/two way bilingual programs with instruction primarily in Spanish, and who are more proficient in Spanish than English. Once the student is at the point of transitioning from Spanish to English reading, or is receiving instruction in English only, the TPRI is recommended. In this paper, children who were administered the *Tejas Lee* will be referred to as Spanish group students; children who were administered the TPRI will be referred to as English group students.

Procedures

Students participating in the investigation as either part of the ERF enriched program or the contrast group were administered the PPVT-III and PK PALS at the beginning and at the end of their pre-kindergarten school year. ERF personnel who had received training on the administration of both tests administered the measures on both occasions. A graduate student proficient with the use of both tests subsequently scored them and entered each one manually into an electronic database. A 20% reliability data check was conducted to ensure accuracy of data entry.

After having participated in ERF enriched preschool programming or in the contrast group, to follow their progress in kindergarten and first grade, each student's respective school

and teacher were located through the school district's language arts coordinator positioned at the district's central office. Children in regular education classrooms were administered the TPRI, while students in bilingual classrooms were administered the Tejas Lee. The students' classroom teachers administered both the TPRI and Tejas Lee tests, after having completed a training session offered by the district. Results of the TPRI and Tejas Lee were entered into an electronic database from which they were subsequently collected for statistical analysis. The data was entered manually into an excel spreadsheet at the item level, and a 20% reliability check was conducted.

CHAPTER IV

RESULTS

The purpose of the present study was to assess over time the effects of ERF-enriched instruction on alphabet knowledge and story comprehension of 110 students previously enrolled in an ERF-enriched program and 129 students previously enrolled in a contrast condition. Two sets of analyses were conducted separately for English and Spanish. Children in the English group consisted of 40 ERF children and 42 contrast children. Students in the Spanish classrooms consisted of 70 ERF children and 87 contrast children.

Specific hypotheses in this study were: (a) Given that both the ERF and contrast groups received formal preschool instruction, we expected to see growth over time in both groups on measures of alphabet knowledge and story comprehension; (b) we predicted that at first post-test (i.e., intercept) ERF and contrast groups would be significantly different from each other and (c) after adding in “group” as a factor, we expected that the growth rates (captured by slopes) would be greater for ERF students than for children in the contrast group.

Chi-Square tests were initially conducted to assess whether the two groups were comparable at baseline in terms of pre-test scores, age, gender, and ethnicity. Characteristics were similar across groups across most variables; however, there were a few statistically significant differences. Within the Spanish group, students in the ERF group were significantly younger than those in the contrast group. Within the English group, on the pretest measure of alphabet knowledge, children in the ERF group scored significantly lower than students in the contrast group. Finally, within the English-only group, there were significant differences with regard to the number of children of different ethnicities in the ERF and contrast groups. In the

ERF group there were significantly more Hispanic children than of any other ethnic group, while in the contrast group there were significantly more African American children than of any other ethnic group. Table 3 shows means for pretest scores, age, gender and ethnicity (statistically significant differences are italicized and bolded).

Table 3

Baseline (pre-test) Group Comparison

	Spanish		English	
	Contrast	ERF	Contrast	ERF
Age	<i>4.46</i>	<i>4.57</i>	4.52	4.55
PALS AK (%)	0.02	0.03	<i>0.29</i>	<i>0.13</i>
PPVT (SS)	62.70	59.06	87.87	82.72
Female (count)	46	36	19	21
Male (count)	44	31	22	20
Hispanic (count)	90	66	11	<i>25</i>
African American (count)	0	1	<i>24</i>	13
Caucasian (count)	0	0	6	3

To ensure that initial differences found between the two groups could not account for any of the effects, the differences were controlled for in the multi-level models by entering all these variables as covariates.

To investigate the three previously mentioned hypotheses, four multilevel models were developed for two subtests of the Tejas Lee (Francis, Carlson, & Cardenas-Hagan, 2006): Spanish alphabet knowledge (i.e, identificación de las letras) and Spanish story comprehension (i.e., comprensión auditiva); and two subtests of the Texas Primary Reading Inventory (TPRI; Center for Academic and Reading Skills, 2004): English Alphabet Knowledge and English Story Comprehension. Alphabet knowledge was collected using the Tejas Lee (Spanish) or TPRI (English) early reading assessments at three time points: fall 2007 (T3), winter 2007 (T4) and spring 2008 (T5). Alphabet knowledge was also measured in English during preschool in the fall 2006 (pretest; T1) and in the spring 2007 (posttest; T2) using the Letter Naming subtest of the Phonological Awareness Literacy Screening- Pre-K (PALS). Due to school district policies, ERF was not permitted to administer preschool Spanish Alphabet knowledge. PALS pre-test scores were entered as a covariate in the alphabet knowledge models for all children. Story comprehension measured at five points in time: kindergarten fall 2007 (T3), kindergarten winter 2007 (T4), kindergarten spring 2008 (T5), first grade fall 2008 (T6), and first grade winter 2008 (T7). The story comprehension multilevel models included all five measures of story comprehension. Table 4 outlines the measurement points for each of the measures and subtests used in the present study.

To obtain equivalency between the English and Spanish alphabet knowledge (given that there are 26 letters in the English language alphabet and 29 letters in the Spanish language alphabet), each student's total number of correctly named letters was transformed into a percentage. Similarly, scale ranges on measures of story comprehension varied between the Tejas Lee (range = 0-5) and TPRI (range = 0-6), so percentages were calculated for these subtests, as well.

Table 4

Measures Administered Across Time Points

Measure	Preschool		Kindergarten			First grade	
	F06 (T1)	S07(T2)	F07(T3)	W07(T4)	S08(T5)	F08(T6)	W08(T7)
PPVT	X	X					
PALS AK	X	X					
TPRI AK.			X	X	X		
TPRI SC			X	X	X	X	X
Tejas Lee AK			X	X	X		
Tejas Lee SC			X	X	X	X	X

Note: AK = Alphabet Knowledge; SC = Story Comprehension; F06(T1) = Pre-K Fall 2006, Time 1; S07(T2) = Pre-K Spring, 2007, Time 2; F07(T3) = kindergarten Fall 2007, Time 3; W07 (T4) = kindergarten Winter 2007, Time 4; S08(T5) = kindergarten Spring 2008, Time 5; F08(T6) = first grade Fall 2008, Time 6; W08(T7) = first grade Winter 2008, Time 7

Three predictors of interest were used in each of the four models: intervention group (dummy coded: ERF group = 1, contrast group = 0), time, and group \times time. The time effect tested the simple effect of time (i.e., growth rate) for children in the control group (since they had been assigned a 0 on the group dummy code). The group effect tested the simple effect of group at time zero, which was the first posttest measurement. In other words, this effect tested whether the groups differed at the first posttest measurement. The group \times time effect tested whether children in the two groups grew at different rates across time. Gender, age, ethnicity (entered with two dummy codes), pretest PPVT, pretest PPVT \times group, and pretest alphabet knowledge (for alphabet knowledge multilevel models) were entered into each of the models as covariates. The pretest PPVT was centered at the group mean. Tables 5 and 6 provide the descriptive

statistics for both groups on the measured variables. Tables 7 and 8 provide a zero-order correlation table of the measured variables.

Table 5

Descriptive Statistics for Spanish Group

	T1	T2	T3	T4	T5
Contrast AK	0.11	0.68	0.84	0.90	-
	(0.20)	(0.31)	(0.13)	(0.12)	-
Contrast SC	0.60	0.50	0.71	0.60	0.72
	(0.30)	(0.31)	(0.30)	(0.30)	(0.22)
ERF AK	0.85	0.94	0.90	-	-
	(0.20)	(0.11)	(0.10)	-	-
ERF SC	0.70	0.50	0.80	-	-
	(0.30)	(0.30)	(0.30)	-	-

Note: AK = alphabet knowledge, SC = Story comprehension, numbers in parentheses are standard deviations.

Table 6

Descriptive Statistics for English Group

	T1	T2	T3	T4	T5
Contrast AK	0.61 (0.30)	0.64 (0.34)	0.82 (0.25)	0.73 (0.40)	-
Contrast SC	0.60 (0.20)	0.68 (0.18)	0.64 (0.22)	0.68 (0.23)	0.85 (0.15)
ERF AK	0.10 (0.15)	0.10 (0.23)	0.94 (0.10)	1.00 -	- -
ERF SC	0.60 (0.25)	0.62 (0.25)	0.67 (0.24)	0.73 (0.17)	0.78 (0.23)

Note: AK = alphabet knowledge, SC = Story comprehension, numbers in parentheses are standard deviations.

Table 7

Zero-Order Correlation Spanish Table

	Pre-PPVT	Pre-PALS-AK	Tejas-AK0	Tejas-AK12	Tejas-SC0	Tejas-SC12	Tejas-SC15
Pre-PPVT	1.00	0.28	.13	.26	.21	.12	0.28
Pre-PALS-AK		1.00	.13	.07	-.03	.16	.08
Tejas-AK0			1.00	-.12	.20	.27	0.23
Tejas-AK12				1.00	.36	.12	0.45
Tejas-SC0					1.00	.45	0.43
Tejas-SC12						1.00	0.59
Tejas-SC15							1.00

Note: Pre-PPVT = Pre-test PPVT, Pre-PALS-AK = pretest PALS alphabet knowledge, Tejas-AK0 = Tejas Lee alphabet knowledge Fall kindergarten, Tejas-AK12 = Tejas Lee alphabet knowledge Spring kindergarten, Tejas-SC0 = Tejas Lee story comprehension fall kindergarten, Tejas-SC12 = Tejas Lee story comprehension spring kindergarten, Tejas-SC15 = Tejas Lee story comprehension Fall first grade.

Table 8

Zero-Order Correlation English Table

	Pre-PPVT	Pre-PALS-AK	TPRI-AK0	TPRI-AK12	TPRI-SC0	TPRI-SC12	TPRI-SC15
Pre-PPVT	1.00	0.32	0.21	0	0.19	-0.36	0.26
Pre-PALS-AK		1.00	0.18	0	0.05	-0.35	-0.01
TPRI-AK0			1.00	0	-0.14	0.39	-0.06
TPRI-AK12				1.00	-0.87	0	0
TPRI-SC0					1.00	0.13	0.30
TPRI-SC12						1.00	-0.31
TPRI-SC15							1.00

Note: Pre-PPVT = Pre-test PPVT, Pre-PALS-AK = pretest PALS alphabet knowledge, TPRI-AK0 = TPRI alphabet knowledge Fall kindergarten, TPRI-AK12 = TPRI alphabet knowledge Spring kindergarten, TPRI-SC0 = TPRI story comprehension fall kindergarten, TPRI-SC12 = TPRI story comprehension spring kindergarten, TPRI-SC15 story comprehension Fall first grade. Zero values are due to low *ns*, resulting in no variance and, therefore, a correlation of zero.

Figures 1-4 show results for each of the four multilevel models: Spanish Alphabet Knowledge, English Alphabet Knowledge, Spanish Story Comprehension, and English Story Comprehension.

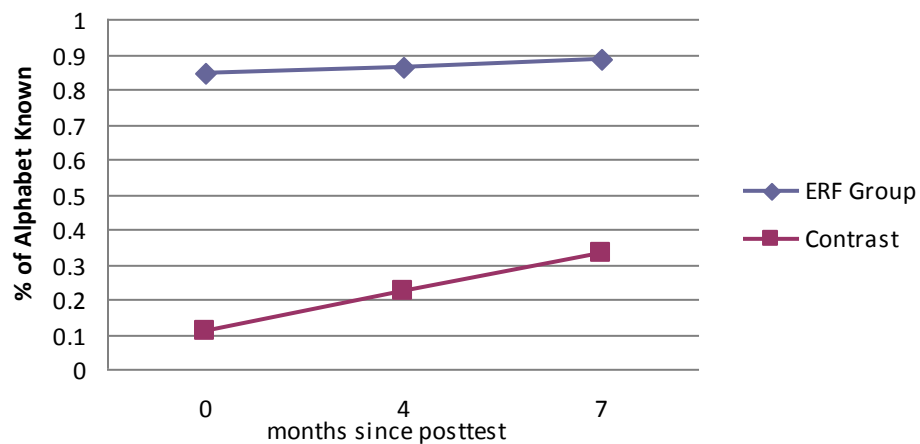


Figure 1
Spanish Alphabet Knowledge

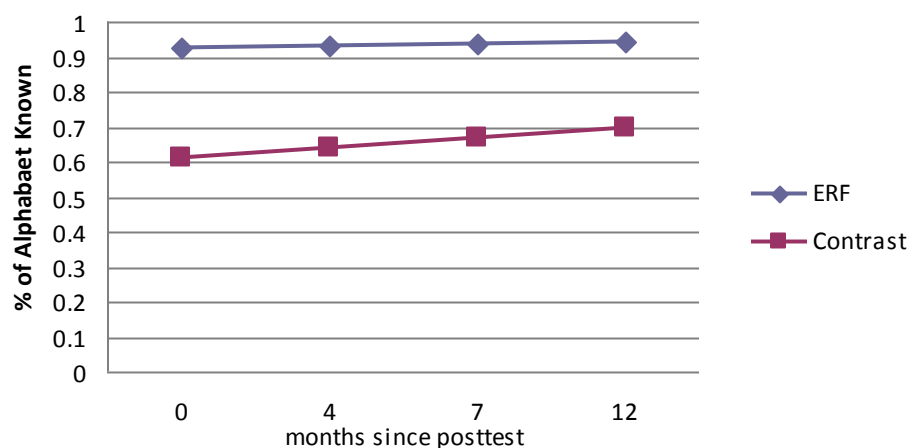


Figure 2
English Alphabet Knowledge

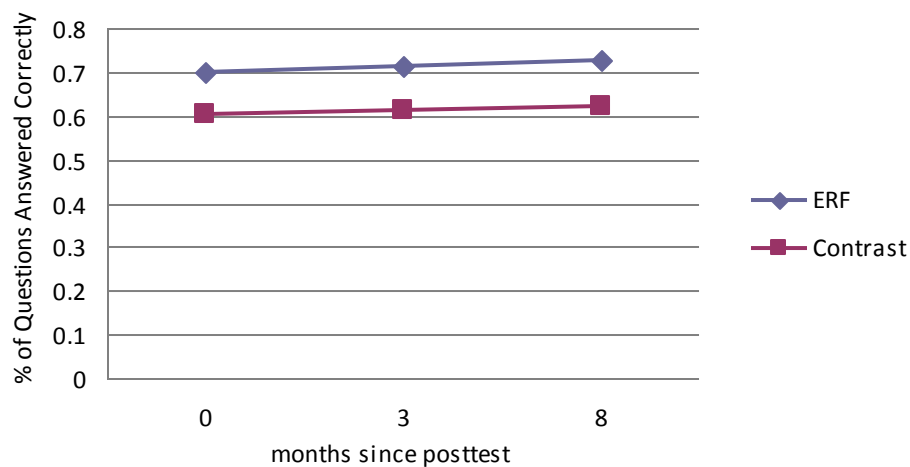


Figure 3
Spanish Story Comprehension

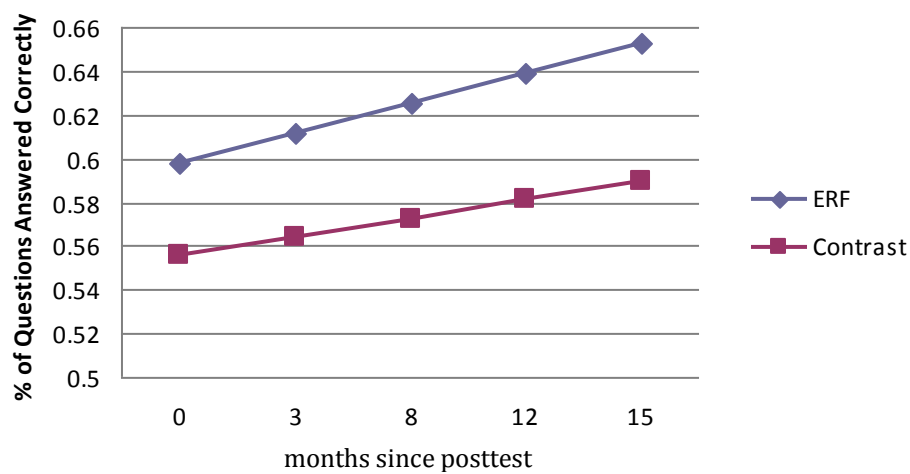


Figure 4
English Story Comprehension

Results by Hypothesis

Hypothesis # 1

The first research hypothesis concerned the growth rate of students' performance on measures of alphabet knowledge and story comprehension. It was expected that both ERF and contrast group students would improve on both measures, given that both groups received formal curricular preschool instruction. This hypothesis involved different time frames for each of the two measures. Student performance was tracked on alphabet knowledge from the beginning of preschool (T1) through the end of kindergarten (T5), and on story comprehension from the beginning of kindergarten (T3) through the end of first grade (T7). Results on both measures for students in the Spanish and English-only groups were as follows:

Spanish alphabet knowledge. Consistent with this hypothesis, the time effect was significant. Students in the contrast group were estimated to increase their knowledge of letters by .11 per month, while students in the ERF group were estimated to increase their knowledge by .02 per month. (The ERF time effect was found by re-estimating the multilevel models with the dummy coding for group reversed.) The fact that the ERF children grew more slowly than the contrast group children on this measure is attributable to a ceiling effect. As will be discussed in the results for the second hypothesis, ERF students nearly reached their maximum potential for growth at the end of their preschool year (T2), while the contrast group students' progress occurred gradually through the end of kindergarten. In other words, after T2, the ERF children had little remaining gains to make, while the contrast group children continued to learn their alphabet more gradually through T5. Table 9 shows results for Spanish alphabet knowledge.

Table 9

Estimates of Fixed Effects for Spanish Alphabet Knowledge

Parameter	Estimate	Std.Error	df	t	Sig
Intercept	-0.76	0.23	85.46	-3.24	0.00
Age	0.20	0.05	85.02	3.85	0.00
Gender	0.06	0.03	85.21	1.10	0.11
Eth 1	0.11	0.15	84.42	0.50	0.62
Pre PPVT	-0.00	0.00	83.69	-0.55	0.58
Pre PALS AK	0.13	0.22	84.37	0.58	0.57
Group	0.71	0.04	107.28	16.67	0.00
PPVT*Group	0.00	0.00	84.39	1.27	0.21
Time	0.11	0.01	65.81	18.46	0.00
Group*Time	-0.09	0.01	109.94	-8.98	0.00

Note: Eth 1 = African American v. Hispanic children comparison, Pre PPVT = Pre-test PPVT, Pre PALS AK = pretest PALS alphabet knowledge.

English alphabet knowledge. Within the English group, the time effect on alphabet knowledge was positive for both ERF and contrast groups but not statistically significant. In other words, both groups grew in a positive direction although not to a statistically significant degree. The same ceiling effect discussed above accounts for why the overall growth rate was negligible for the English group on alphabet knowledge. Like in the Spanish group, most students had nearly reached their maximum potential for growth by the first post-intervention

testing point. Children in both groups learned about .03 (rounded) of their alphabet per month, given that, as will be discussed in the third hypothesis, the interaction effect was not statistically significant. Table 10 shows results for English alphabet knowledge.

Table 10

Estimates of Fixed Effects for English Alphabet Knowledge

Parameter	Estimate	Std. Error	df	t	Sig.
Intercept	0.54	0.45	45.70	1.21	0.23
Age	-0.01	0.10	45.44	-0.07	0.95
Gender	-0.02	0.05	44.30	-0.36	0.72
Eth1	-0.01	0.06	44.53	-0.20	0.85
Eth2	-0.05	0.10	39.60	-0.45	0.65
PPVT	0.00	0.00	45.91	0.50	0.63
Pre PALS AK	0.23	0.12	43.43	1.89	0.07
Group	0.37	0.10	54.11	3.76	0.00
PPVT* Group	-0.00	0.00	44.04	-0.40	0.07
Time	0.03	0.01	38.78	1.89	0.07
Group * Time	-0.02	0.02	33.48	-1.20	0.24

Note: Eth 1 = African American v. Hispanic children comparison, Eth 2 = Caucasian v. Hispanic children comparison, Pre PPVT = Pre-test PPVT, Pre PALS AK = pretest PALS alphabet knowledge.

Spanish story comprehension. Also consistent with the first hypothesis, the effect of time was significant and positive for both ERF and contrast groups on the measure of story comprehension. Again, as will be discussed on the third hypothesis, the interaction was not significant, which suggests that children in both groups improved about .01 per month in story comprehension. Table 11 shows results for Spanish story comprehension.

Table 11

Estimates of Fixed Effects for Spanish Story Comprehension

Parameter	Estimate	Std. Error	df	t	Sig.
Intercept	-0.16	0.32	84.87	-0.50	0.62
Age	0.15	0.07	84.80	2.10	0.04
Gender	0.13	0.04	84.32	3.23	0.00
Eth1	-0.07	0.21	101.17	-0.33	0.74
PPVT	0.00	0.00	73.96	1.01	0.32
Group	0.03	0.06	146.12	0.43	0.67
PPVT* Group	0.00	0.00	84.16	0.56	0.58
Time	0.01	0.00	277.35	3.45	0.00
Group * Time	0.00	0.01	272.63	0.62	0.53

Note: Eth 1 = African American v. Hispanic children comparison, Pre PPVT = Pre-test PPVT.

English story comprehension. The time effect was significant and positive. English group students within both the ERF and contrast groups improved about .01 per month in story comprehension. Table 12 shows results for English story comprehension.

Table 12

Estimates of Fixed Effects for English Story Comprehension

Parameter	Estimate	Std. Error	df	t	Sig.
Intercept	0.20	0.27	54.16	0.75	0.46
Age	0.09	0.06	53.97	1.54	0.13
Gender	0.04	0.03	51.07	1.10	0.28
Eth1	-0.04	0.04	49.98	-1.20	0.24
Eth2	-0.20	0.06	53.62	-3.07	0.00
PPVT	0.01	0.00	59.13	2.81	0.01
Group	-0.14	0.06	86.57	-2.38	0.02
PPVT * Group	0.00	0.00	57.14	0.30	0.77
Time	0.01	0.00	184.06	2.25	0.03
Group * Time	0.01	0.00	183.78	1.10	0.27

Note: Eth 1 = African American v. Hispanic children comparison, Eth 2 = Caucasian v. Hispanic children comparison, Pre PPVT = Pre-test PPVT.

Hypothesis # 2

The second hypothesis concerned short-term growth in students' alphabet knowledge and story comprehension and posed the expectation that at first post-testing (i.e., intercepts), ERF and contrast groups would be significantly different from each other. It was predicted that at first posttest, ERF children would perform better than their contrast group counterparts on measures of alphabet knowledge and story comprehension. First posttest time points were

different for each of the two measures. Alphabet knowledge was first measured at post-program at the end of pre-kindergarten (T2), while story comprehension was first measured at post-program at the beginning of kindergarten (T3). Results on both measures for students in the Spanish and English-only groups were as follows:

Spanish alphabet knowledge. The group effect on this measure was significant and positive. Children in the Spanish ERF group knew .71 more of their alphabet at the first post-treatment (T2) measurement than did children in the contrast group. The effect size for the Spanish ERF group on this measure was substantial (Hedges $\delta = 4.14$), reflecting a great deal of short-term growth in ERF students on that domain. At this time point, ERF children on average knew 85% of their alphabet, while students in the contrast group on average knew 11%. ERF children therefore essentially mastered their alphabet by the end of preschool.

English alphabet knowledge. The group effect on alphabet knowledge was significant and positive within the English group. With an effect size of $\delta = 1.49$, students in the ERF group knew .37 more of their alphabet at the first post-intervention (T2) measurement than did students in the contrast group.

Spanish story comprehension. On the measure of story comprehension, the effect of group was not significant for the Spanish group. Students in the ERF group did not perform significantly better than the students in the contrast group on story comprehension at the first measurement (T3).

English story comprehension. The group effect on this measure was significant but negative, with an effect size of $\delta = -.68$, indicating that the ERF children scored *worse* than contrast children at the first measurement (T3).

Hypothesis # 3

In the third research hypothesis, we were interested in the effect of ERF-enriched instruction on story comprehension compared to the contrast instruction. This hypothesis concerned the performance of the Spanish and English-only students in the ERF-enriched programming on measures of alphabet knowledge and story comprehension, over time through the middle of first grade, compared to that of students in the contrast group. Results on both measures for students in the Spanish and English-only groups were as follows:

Spanish alphabet knowledge. Due to the dramatic growth (i.e., ceiling effect) that the ERF children showed at T2, the group \times time effect was significant and negative. This indicates that the children in the ERF group were increasing by .09 *less* than children in the contrast group per month. In other words, their estimated growth rate was only .02 (.11 – .09) per month.

English alphabet knowledge. The group \times time interaction was not significant, suggesting that children in the two groups grew at about the same rate.

Spanish story comprehension. The group \times time effect was not significant. Because the interaction was not significant, this suggests that children in both groups improved about .01 per month in story comprehension. Students in the two groups grew at the same rate.

English story comprehension. The group \times time effect was not significant but it was positive. This result suggests that children in the ERF group were growing faster in story comprehension than were children in the contrast group, although the difference between the two slopes was not significant.

Qualitative Teacher Information

To informally assess teacher perception and acceptability of the program, ERF teachers were interviewed at post-intervention during spring 2009 using a semi structured interview

format. Teachers reported a general appreciation for the program, including its structure, components and results. Teachers reported that they considered the professional development component to be high-quality and intensive, and some considered it to be too intensive. Four out of the seven teachers voiced concern over it being delivered after school, at a time when all teachers were exhausted. In terms of student gains, teachers reported having noticed an increase in their students' vocabulary as well as in their exposure to new concepts and ideas through the developmental centers. In addition, teachers reported that students' ability to listen, problem-solve and interact effectively with peers and teachers increased tremendously throughout the year. Teachers in general considered that the full-day model was particularly beneficial to their students. According to all teachers, students enjoyed the program and appeared to like coming to school each day. They expressed that the program sparked in every student an excitement about learning. To view the semi structured interview questionnaire, see Appendix A.

CHAPTER V

DISCUSSION AND CONCLUSION

The present study evaluated the effectiveness of ERF preschool enrichment on short and mid-term early literacy outcomes of two groups of low income high-risk preschoolers in comparison to a contrast group. The first group consisted of 40 ERF English preschoolers and 42 English contrast preschoolers. The second group consisted of 70 ERF Spanish and 87 Spanish contrast preschoolers.

In the first hypothesis we found that for Spanish alphabet knowledge and English and Spanish story comprehension, both ERF and contrast groups experienced statistically significant positive growth over time. However, for English alphabet knowledge, while both groups grew in the right direction, the improvement made was not statistically significant. These findings are consistent with the other known evaluations of a preschool enrichment programs where researchers have used multilevel modeling to document growth over time for all children enrolled in the studies. In their study, St Pierre, Riccuiti and Rimdzius (2005) evaluated the short and long-term effects of 18 Even-Start programs. As in the present findings, the authors found that both control and Even Start groups made equivalent gains on literacy assessments at three measuring points spanning two years. Taken together, the present findings and those of Pierre et al. are not surprising given that in both studies contrast and treatment children received some form of preschool instruction and, developmentally, all preschoolers were expected to mature over time.

Also related to the first hypothesis, was one notable finding for English and Spanish alphabet knowledge. Although both groups grew over time, the ERF group did so at a slower

rate than the contrast group. This is likely attributable to a ceiling effect such that most of the alphabet learned by students in both the English and the Spanish group was in the short-term and not over the remaining measurement points. In other words, the ERF children literally “maxed” out on alphabet letters.

On the second hypothesis, we were interested in investigating the short-term differences across all variables between the ERF and contrast group in both English and Spanish. It was hypothesized that, due to the ERF enriched instruction, the ERF group would initially surpass the contrast group on all measured variables. This hypothesis was partially supported. For alphabet knowledge, the ERF group did indeed perform better at first posttest than the contrast group. The effect sizes for alphabet knowledge were substantial (Hedges $\delta = 4.14$ for the Spanish ERF and Hedges $\delta = 1.49$ for the English ERF group), indicating that the ERF group students showed a great deal of growth from pretest to posttest on that domain. This short-term dramatic growth may account for why in the first hypothesis we did not find statistical significance in the ERF English group’s growth rate (i.e., the ceiling effect). Indeed, the ERF children essentially mastered their alphabet by the first posttest. Findings in the present study are consistent with the two most recent national Head Start impact studies (Puma et al., 2005; 2010), as well as with the national ERF evaluation (Jackson et al., 2007), all of which found positive short-term effects for letter-naming compared to non-funded programs. Together, the findings of the present study and those of large-scale Head Start and ERF studies constitute mounting evidence that one year of targeted high-quality preschool programming can drastically increase high-risk students’ alphabet knowledge.

The results for story comprehension were unexpected. For Spanish story comprehension there was no statistically significant differences between the ERF and the contrast group,

indicating no short-term effects in this domain. These findings are similar to what other preschool programs have found on related broad cognitive measures. For example, the national evaluation of ERF found no discernable effect on auditory comprehension or oral language, despite the finding that ERF had pervasive impacts on the general quality of the preschool classroom, including classroom language environment, materials, and teaching practices that support early literacy (Jackson et al., 2007). Similarly, Martin, Emginger, Snyder & O'Neal (2007) reported that the difference between ERF and comparison children on the Peabody Picture Vocabulary Test-III (PPVT III; Dunn & Dunn, 1997) oral language normalized curve equivalency (NCE) gain scores was not statistically significant. Likewise, the most recent Head Start impact study (Puma, 2010) reported there were no significant long-term effects on Head Start children's language ability. As such, the findings for Spanish story comprehension while disappointing are not surprising.

On the other hand, for English story comprehension the results were counterintuitive. The results were statistically significant, yet there were in a negative direction, meaning that at posttest, ERF children performed worse than the contrast group. One possibility for why this may have occurred is that the children assessed as part of the ERF English group were predominately English language learners (ELL) may not have been ready for English instruction. In fact, looking at the English group baseline differences, there were statistically significantly more Hispanic children than any other ethnicity in the English ERF group than in the contrast group. It is a possibility that, having been placed to early in English instruction, these Spanish-dominant students were never able to catch up to their contrast group English-dominant counterparts in terms of English language abilities.

In hypothesis number three we were interested in the group-by-time interaction between the ERF and contrast group. We hypothesized that the ERF group would perform significantly better across all variables than the contrast group across time. Our hypothesis was not supported. For alphabet knowledge in Spanish, there was a significant difference between groups but in a counterintuitive direction. The ERF group performed lower than the contrast group. This again is likely attributable to a ceiling effect on alphabet knowledge. As discussed in the method section, the administration of both the Tejas Lee and the TPRI follows branching rules, and it is indicated that when a student has obtained a cut-off score at or above the ‘developed’ range, that same skill is to not be subsequently re-assessed. Because, as our results suggest, most ERF children obtained scores at or above the ‘developed’ range at the end-of-the-year preschool testing point, the alphabet knowledge subtest was not re-administered to them. This indicates that while students in the contrast group had room to grow through the next testing point, students in the ERF group had essentially reached their ceiling or mastered the alphabet.

For alphabet knowledge in English and story comprehension in English and Spanish, there were no group differences over time. These, while disappointing, are not unexpected results considering our overall findings. On the measure of alphabet knowledge all children ultimately mastered the skill, so the slope captured how immediately or gradually this occurred. On the measure of story comprehension, given that there were no short-term effects to begin with, this trend was, as would be expected, maintained over time.

Summary

To summarize, this study found ERF to have a significant and positive impact on alphabet knowledge but not on story comprehension. This result was observed on both Spanish-dominant and English-only groups. These findings are consistent with those of other high-

quality preschool enrichment programs in suggesting that Early Reading First enrichment is effective at increasing students' alphabet knowledge, but not their receptive oral language ability.

Tentative Implications

Because alphabet knowledge is a narrow literacy skill that is easily taught and mastered in a brief time (Barnett & Frede, 2010) it is not surprising that results of study are consistent with those of other preschool enrichment program evaluations. Our results are further evidence that targeted, high-quality early childhood instruction can effectively increase alphabet knowledge in high-risk preschoolers. This is important, given that improvement in alphabet knowledge is associated with later reading achievement. Not only are gains in alphabet knowledge associated with later reading decoding ability, it is one of the strongest and most robust markers for children's later ability to decode reading (Denton & West, 2006). Furthermore, children's ability to name letters is related to phonological awareness, which is also highly correlated with later reading and spelling achievement (Whitehurst & Lonigan, 1998; Strickland & Shanahan, 2004).

On the other hand, story comprehension is a broad construct requiring oral language and listening comprehension abilities. It is important to keep in mind that, as such, story comprehension is not only more difficult to target, teach, and master, but also more difficult to gauge with precision. This may be why, when matched against related broad cognitive measures, findings concerning the insufficient gains on story comprehension made by ERF students compared with contrast group students fit well with the findings of other research studies. Furthermore, there are a number of issues, including potential shortcomings of the ERF program enrichment, that could explain why ERF had no discernible effects on ERF students' story comprehension when compared to their contrast peers.

Could the program not have been intensive enough?

First, it is important to consider that the program may not have been sufficiently intensive. Our program targeted high-risk, low-income at-risk preschoolers. As discussed in the review of the literature, we know that poverty is associated with numerous risk factors, beginning in the prenatal period. Likely born into intellectually impoverished, under-stimulating environments, and exposed to poor nutrition and chronic stress, the students in the present study may have required even more intensive instruction. ERF attempted to address this need through carefully planned and delivered full-day instruction; however, even this kind of enrichment may not be sufficient to mitigate the harmful effects of poverty on student's language and listening comprehension abilities.

Could the quality of the instruction have been insufficient?

Our program addressed the need for high quality instruction through ERF's four main components: professional development, print-rich and high-quality language environment, methods based on scientifically based reading research (SBRR), and screening and progress monitoring instruments. Potential setbacks to these components, which could have compromised the overall effectiveness of the program, are addressed in the following section.

Professional development. ERF places significant emphasis on high-quality teacher professional development. Indeed, during the 2006-2007 academic year ERF teachers and teachers' aides participated in an average of 76.6 hours of professional development. Teachers provided interesting feedback about the professional development component during the semi structured teacher interview conducted as part of this study in spring 2009. Five out of eight teachers reported that the quality of the professional development was exceptional. At the same time, some also stated that the professional development was excessive, and that it overwhelmed

them with too much information. Teachers voiced concern that the trainings were delivered after-school, at a time in the day when they were exhausted after an entire day teaching.

Provided that the ERF professional development offered teachers the kind of instruction they needed, this information brings into question whether the teachers were able to absorb, learn and apply the material.

High-quality language and print rich- classroom environments. As part of its enriched classroom environments component, ERF promotes the provision of smaller student-teacher ratios. Unfortunately, as Whitehurst and colleagues (1994) have suggested, “even if the groups are small and the forms of interaction are optimized” group-based interactions may not be sufficient, particularly given the high-risk status of our students (p. 16). The amount of one-on-one language interactions with an adult that high-risk students require is so high, it may not be feasibly provided within a small-group classroom. The frequency of one-on-one language interactions in the present study may have been less than optimal. As such, it is possible that for the program to be effective an even smaller teacher-student ratio would have been desirable in the present study.

Scientifically based reading research (SBRR). The results of this study suggest that the curriculum and instructional methodologies for teaching alphabet knowledge employed in ERF met our students’ needs. Unfortunately, the activities targeting students’ story comprehension (as measured by the TPRI and Tejas LEE) may not have been sufficiently effective. Given how far behind children of low socio economic status are in their oral language development by the time they enter into preschool (Hart & Risley, 1995), it possible that, regardless of quality, few curricula or are sufficiently potent to compensate for years of deprived home literacy environments. As discussed in the Method section, our Tier I curriculum, Scholastic Early

Childhood Program (SECP; Block, Canizares, Church, & Lobo, 2008), was developed according to SBRR to address children's language, cognitive, and early reading skills in close alignment with the goals of ERF. However, its efficacy has not been investigated by independent studies, and the possibility of it not meeting high-risk children's needs remains.

Could ERF programs start too late?

The students in the present study began attending preschool at approximately 4.5 years of age. Considering that children begin developing language from birth and that significant cognitive, social, and behavioral disparities are evident in disadvantaged 9-month-olds (Shonkoff & Phillips, 2000), one can assume that by age 4.5 certain windows of optimal sensitivity in children's development may have begun to close. Indeed, programs that have produced lasting results in measures of language comprehension, such as Abecedarian project (Campbell et al., 2008) or the Perry preschool program (Berrueta-Clement et al., 1984) have begun much earlier. Students in the Abecedarian project began at only 6-12 *weeks* of age, while Perry preschool students began the program at age three. Head Start, which has traditionally started at age four, has not produced lasting effects on children's language. In other words, by the time they begin preschool it may be too late.

The question of whether one year of high-quality early childhood instruction can effectively increase story comprehension in high-risk preschoolers merits asking. It is reasonable to assume that one year of ERF-enriched preschool programming is simply not sufficient to produce discernable growth in high-risk students' ability to comprehend spoken language, especially for high-risk preschoolers. It is possible that the students served by ERF begin preschool so far behind linguistically, that they may not have been able to benefit from the oral language enrichment it provides. In fact, Lonigan and colleagues (1998) argue that high-risk

preschoolers (e.g., low income, English language learners) often begin preschool one to one and a half standard deviations behind in oral language. In other words, when students enter preschool, the knowledge they bring may not be sufficient to serve as a solid foundation on which to anchor new information. Regardless of how intensive, one year of exposure to language enrichment may not buffer against the amount of language not learned within the child's first three years of life. To accomplish its goals, ERF and similar preschool enrichment programs may need to be extended from a one-year program to a two-year program, beginning at the latest, at age 3.

Limitations

There were a number of limitations in the present study that must be addressed. To begin with, the sample size was small, which limited statistical power. Second, the fact that there were almost two times as many students within the Spanish than within the English-only group is a threat to the study's internal validity. Because the Spanish group was much larger, it was easier to find statistical significance within that group than within the English group. The fact that there were overwhelmingly more Hispanic students than of any other ethnic group within the entire sample, regardless of group, is another threat to internal validity. Indeed, even within the English group, the majority of the children were Hispanic. Hispanic students tend to be exposed to Spanish to varying degrees, and we do not know the extent to which they were exposed to Spanish at home. As such, Hispanic students' ELL status could have confounded the findings of the present study, perhaps acting as a moderating variable.

Another limitation of the study was student attrition. A large number of students could not be tracked through the entire two and a half years, diminishing the study's ability to capture the full effect of the enrichment program, particularly on the measure of story comprehension.

Moreover, the school district dictated what measurement instruments were to be used as part of the present study to track children's performance. These instruments (i.e. TPRI and Tejas Lee) had a number of limitations. At approximately 120 words, with no pictures or visuals, the story comprehension passages did not seem to be developmentally appropriate for measuring students' story comprehension ability. Picture-less and wordy, the passages did not seem engaging to students and seemed to not only measure the student's ability to comprehend language, but also the ability to pay attention long enough. In addition, the school district did not permit the measurement of phonological awareness-an important precursor to reading ability and a target of ERF. According to the school district, they did not want the children "over tested."

Another limitation of this study is the confounding of ERF instructional enhancement and length of the preschool day. ERF students attended preschool all-day, while the contrast group preschoolers attended half-day preschool classrooms. The impact of the program on alphabet knowledge may have been due to the instructional practices employed in the ERF classrooms, to spending more time in preschool classroom thereby more teacher-child engagement around literacy, or to a combination of both. The unequal amount of instructional time is an additional threat to internal validity. Finally, children were not randomly assigned to treatments, as it occurs in all quasi-experimental studies.

Direction for Future Research

Story comprehension was first measured at the beginning of kindergarten, so a minimum of two months had elapsed since the students had last been exposed to ERF. No data was collected on story comprehension during the ERF year, so whether or not the students made any gains in that domain prior to the end of the program is unknown. The question of whether students in any group may or may not have regressed during the summer months remains. We

also lack information regarding the quality of the oral language environment to which students were exposed from the beginning of kindergarten. As such, in that regard, this study's findings on story comprehension are inconclusive. Future studies may need to assess story comprehension immediately at the end of pre-kindergarten instead of doing so months later, at the beginning of kindergarten. In addition, investigators should consider adopting a story comprehension probing system to assess students' progress on this domain regularly throughout the preschool year. Probing students' story comprehension monthly, for instance, would greatly improve a study's ability measure the true short-term impact of the ERF program on story comprehension.

In addition, investigators should explore the feasibility of increasing the duration of ERF downward by at least one year. Given that the earlier children acquire the essential skills the greater the likelihood of better long-term outcomes (Shonkoff & Phillips, 2000), exposing children to ERF enrichment one year earlier may very well be necessary. Finally, future studies should explore differences between intensive home-based intervention group and school-based only ERF group.

Conclusion

In conclusion, the ERF preschool enrichment program is a federal initiative that seeks to buffer against the detrimental effects of poverty on children's academic outcomes by incorporating all of the elements supported by scientifically-based reading research to address the present and future reading gaps of high-risk young children. The tenets of ERF are teacher professional development, high quality language and print-rich environments, the teaching of emergent instruction of emergent literacy skills based on scientifically based reading research (SBRR) and the early identification of reading problems through the informed use of appropriate

assessment measures. The present study assessed the short and mid-term effects of this program on bilingual and English-only students' alphabet knowledge and story comprehension.

Results of the present study support the findings reported by similar prior studies, indicating that while ERF effectively increases students' alphabet knowledge, greater effort is necessary toward programming for increasing student outcomes on story comprehension. Because of the extensive amount of research behind it, there is no question the enrichment provided by ERF is essential. Unfortunately, however, its scope and intensity may not be sufficient for it to have the desired impact on high-risk children's oral story comprehension. There are various reasons why this may be the case: (a) ERF may not start soon enough. Starting at age four may not be early enough to mitigate the harmful effects of poverty. We know that building background knowledge is a slow process that gradually accumulates, so it must be fostered intensively as early in life as possible (Hirsch, 2007; Shonkoff & Phillips, 2000). Therefore, entry into preschool at age four may very likely not be soon enough. Only one year of school-day exposure to high quality language and print-rich environment may very likely not be sufficient, (b) ERF may not be sufficiently potent to mitigate poverty's harmful effects on children's cognitive skills, including building capacity for higher level thinking, and retention of knowledge over time. As it is, ERF does demonstrate significant effects on alphabet knowledge, which will increase the likelihood that students will become skilled at decoding. However, given that becoming a skilled decoder does not ensure proficient reading ability, the language component remains critical. Indeed, without comprehension, reading proficiency cannot occur. There is no question that for any literacy program targeting high-risk students to have an impact on their reading ability, it is fundamental to increase their outcomes on broad language abilities, including story comprehension.

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APPENDIX A

Semi-structured Interview for Participating Teachers

1. Imagine you are describing Early Reading First to other teachers who haven't participated in the project. How would you describe it?
2. Can you describe what Early Reading First literacy instruction looked like in your classroom?
3. What do you feel were the key components or important parts of ERF preschool enrichment?
4. As an ERF teacher, what do you feel you learned about skills children must acquire and develop prior to entering kindergarten?
5. How has the way you teach pre-literacy skills (i.e., alphabet knowledge, print concepts, oral language, and phonological awareness) to preschoolers changed through your involvement as an ERF teacher?
6. What do you see as the strengths of the ERF enrichment program?
 - a. What parts do you like best?
 - b. Which parts do you feel the students gain most from?
7. How effective do you feel the professional development provided through Early Reading First was?
 - a. What did you like the most?
 - b. What was most helpful?

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